Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (previously amended) A mass spectrometer comprising:

an ion source for producing ions;

an input vacuum chamber comprising at least one AC ion guide for transmitting said ions, said AC ion guide comprising a plurality of electrodes having apertures, said apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

an analyzer vacuum chamber comprising an ion mass analyzer disposed to receive ions after they have been transmitted by said ion guide;

at least one differential pumping apertured electrode through which ions may pass, said at least one differential pumping apertured electrode being disposed between said input vacuum chamber and said analyzer vacuum chamber to permit said analyzer vacuum chamber to be maintained at a lower pressure than said input vacuum chamber;

at least one alternating current (AC) generator connected to an input chamber reference potential for providing AC potentials to said plurality of electrodes;

wherein:

at least 90% of said apertures are substantially the same size;

at least 90% of said plurality of electrodes forming said AC ion guide are connected to said AC generator in such a way that at any instant during an AC cycle of the output of said AC generator, adjacent ones of said electrodes are supplied respectively with approximately equal positive and negative potentials relative to said input chamber reference potential; and

wherein said input vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) ≥ 0.1 mbar; (ii) ≥ 0.5 mbar; (iii) ≥ 0.7 mbar; (iv) ≥ 1.0 mbar; (v) ≥ 1.3 mbar; (vi) ≥ 1.5 mbar; (vii) ≥ 2.0 mbar; (viii) ≥ 2.5 mbar; (ix) ≥ 3.0 mbar; (x) ≥ 3.5 mbar; (xi) ≥ 4.0 mbar; (xii) ≥ 4.5 mbar; (xiii) ≥ 5.0 mbar; (xiv) ≥ 6.0 mbar; (xv) ≥ 7.0 mbar; (xvi) ≥ 8.0 mbar; (xvii) ≥ 9.0 mbar; (xviii) ≥ 10.0 mbar; (xix) 1-5 mbar; (xx) 1-2 mbar; and (xxi) 0.5-1.5 mbar.

2. (original) A mass spectrometer as claimed in claim 1, wherein said electrodes comprise a plate having an aperture therein.

3. (original) A mass spectrometer as claimed in claim 1, wherein said electrodes comprise a wire or rod bent to form a substantially closed ring.

4. (original) A mass spectrometer as claimed in claim 1, wherein alternate ones of said electrodes are connected to each other and to one of the output connections of a single AC generator.

5. (previously amended) A mass spectrometer as claimed in claim 1, wherein the AC ion guide comprises at least 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100 electrodes.

6. (original) A mass spectrometer as claimed in claim 1, wherein said electrodes have internal diameters or dimensions selected from the group consisting of: (i) $\leq$ 5.0 mm; (ii) $\leq$ 4.5 mm; (iii) $\leq$ 4.0 mm; (iv) $\leq$ 3.5 mm; (v) $\leq$ 3.0 mm; (vi) $\leq$ 2.5 mm; (vii) 3.0 $\pm$ 0.5 mm; (viii) $\leq$ 10.0 mm; (ix) $\leq$ 9.0 mm; (x) $\leq$ 8.0 mm; (xi) $\leq$ 7.0 mm; (xii) $\leq$ 6.0 mm; (xiii) 5.0 $\pm$ 0.5 mm; and (xiv) 4-6 mm.

7. (currently amended) A mass spectrometer as claimed in claim 1, wherein the length of said ~~AC-only~~ AC ion guide is selected from the group consisting of: (i) $\geq$ 100 mm; (ii) $\geq$ 120 mm; (iii) $\geq$ 150 mm; (iv) 130 $\pm$ 10 mm; (v) 100-150 mm; (vi) $\leq$ 160 mm; (vii) $\leq$ 180 mm; (viii) $\leq$ 200 mm; (ix) 130-150 mm; (x) 120-180 mm; (xi) 120-140 mm; (xii) 130 mm $\pm$ 5, 10, 15, 20, 25 or 30 mm; (xiii) 50-300 mm; (xiv) 150-300 mm; (xv) $\geq$ 50 mm; (xvi) 50-100 mm; (xvii) 60-90 mm; (xviii) $\geq$ 75 mm; (xix) 50-75 mm; (xx) 75-100 mm; (xxi) 150-200 mm; (xxii) $\geq$ 200 mm; and (xxiii) 50-200 mm.

8. (previously amended) A mass spectrometer as claimed in claim 1, further comprising:

an intermediate vacuum chamber disposed between said input vacuum chamber and said analyzer vacuum chamber, said intermediate vacuum chamber comprising an AC ion guide for transmitting ions through said intermediate vacuum chamber, said AC ion guide arranged in said intermediate vacuum chamber comprising a plurality of electrodes having apertures, the apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

at least one further differential pumping apertured electrode through which ions may pass, disposed between said vacuum chambers to allow said intermediate vacuum chamber to be maintained at a lower pressure than said input vacuum chamber, and said analyzer vacuum chamber to be maintained at a lower pressure than said intermediate vacuum chamber; and

an alternating current (AC) generator connected to an intermediate chamber reference potential for providing AC potentials to the AC ion guide in said intermediate vacuum chamber.

9. (previously amended) A mass spectrometer as claimed in claim 8, wherein:

at least 90% of the apertures of the electrodes forming said AC ion guide in said intermediate vacuum chamber are substantially the same size; and

at least 90% of said plurality of the electrodes forming said AC ion guide in said intermediate vacuum chamber are connected to the AC generator connected to said intermediate chamber reference potential in such a way that at any instant during an AC cycle of the output of the AC generator, adjacent ones of said electrodes forming said AC ion guide arranged in said intermediate vacuum chamber are supplied respectively with approximately equal positive and negative potentials relative to said intermediate chamber reference potential.

10. (previously amended) A mass spectrometer as claimed in claim 8, wherein the AC ion guide in said intermediate vacuum chamber comprises at least 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100 electrodes.

11. (original) A mass spectrometer as claimed in claim 8, wherein said intermediate vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) 10^{-3}-10^{-2} mbar; (ii) $\geq 2 \times 10^{-3}$ mbar; (iii) $\geq 5 \times 10^{-3}$ mbar; (iv) $\leq 10^{-2}$ mbar; (v) 10^{-3}-5×10^{-3} mbar; and (vi) 5×10^{-3}-10^{-2} mbar.

12. (previously amended) A mass spectrometer as claimed in claim 8, wherein electrodes forming said AC ion guide in said intermediate vacuum chamber have internal diameters or dimensions selected from the group consisting of: (i) ≤ 5.0 mm; (ii) ≤ 4.5 mm; (iii) ≤ 4.0 mm; (iv) ≤ 3.5 mm; (v) ≤ 3.0 mm; (vi) ≤ 2.5 mm; (vii) 3.0 ± 0.5 mm; (viii) ≤ 10.0 mm; (ix) ≤ 9.0 mm; (x) ≤ 8.0 mm; (xi) ≤ 7.0 mm; (xii) ≤ 6.0 mm; (xiii) 5.0 ± 0.5 mm; and (xiv) 4-6 mm.

13. (original) A mass spectrometer as claimed in claim 8, wherein the length of said ion guide in said intermediate vacuum chamber is selected from the group consisting of: (i) ≥ 100 mm; (ii) ≥ 120 mm; (iii) ≥ 150 mm; (iv) 130 ± 10 mm; (v) 100-150 mm; (vi) ≤ 160 mm; (vii) ≤ 180 mm; (viii) ≤ 200 mm; (ix) 130-150 mm; (x) 120-180 mm; (xi) 120-140 mm; (xii) 130 mm ± 5, 10, 15, 20, 25 or 30 mm; (xiii) 50-300 mm; (xiv) 150-300 mm; (xv) ≥ 50 mm; (xvi) 50-100 mm; (xvii) 60-90 mm; (xviii) ≥ 75 mm; (xix) 50-75 mm; (xx) 75-100 mm; (xxi) 150-200 mm; (xxii) ≥ 200 mm; and (xxiii) 50-200 mm.

14. (original) A mass spectrometer as claimed in claim 1, wherein said ion source is an atmospheric pressure ion source.

15. (original) A mass spectrometer as claimed in claim 1, wherein said ion source is a continuous ion source.

16. (original) A mass spectrometer as claimed in claim 1, wherein said ion source is an Electrospray ("ES") ion source or an Atmospheric Pressure Chemical Ionisation ("APCI") ion source.

17. (original) A mass spectrometer as claimed in claim 1, wherein said ion source is an Inductively Coupled Plasma ("ICP") ion source.

18. (original) A mass spectrometer as claimed in claim 1, wherein said ion source is a Matrix Assisted Laser Desorption Ionisation ("MALDI") ion source.

19. (previously amended) A mass spectrometer as claimed in claim 1, wherein said ion mass analyser is selected from the group consisting of: (i) a time-of-flight mass analyser; (ii) an orthogonal time of flight mass analyser; (iii) a quadrupole mass analyser; and (iv) a quadrupole ion trap.

20. (canceled)

21. (previously amended) A mass spectrometer as claimed in claim 1, wherein said input vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of (i) ≤ 20mbar; and (ii) ≤ 30 mbar.

22. (previously amended) A mass spectrometer as claimed in claim 1, wherein the AC ion guide comprises at least one comb arrangement comprising a longitudinally extending member having a plurality of electrodes having apertures depending therefrom.

23. (original) A mass spectrometer as claimed in claim 22, wherein said input vacuum chamber has a length and said comb arrangement extends at least x% of said length, x% selected from the group consisting of: (i) ≥ 50%; (ii) ≥ 60%; (iii) ≥ 70%; (iv) ≥ 80%; (v) ≥ 90%; and (vi) ≥ 95%.

24. (previously amended) A mass spectrometer comprising:

an ion source for producing ions;

an input vacuum chamber comprising at least one AC ion guide for transmitting said ions, said AC ion guide comprising a plurality of electrodes having apertures, said apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

an analyzer vacuum chamber comprising an ion mass analyzer disposed to receive ions after they have been transmitted by said ion guide;

at least one differential pumping apertured electrode though which ions may pass, said at least one differential pumping apertured electrode being disposed between said input vacuum chamber and said analyzer vacuum chamber to permit said analyzer vacuum chamber to be maintained at a lower pressure than said input vacuum chamber;

wherein:

at least 90% of said apertures are substantially the same size;

at least 90% of said plurality of electrodes forming said AC ion guide are connected to an AC generator; and

wherein said input vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) ≥ 0.1 mbar; (ii) ≥ 0.5 mbar; (iii) ≥ 0.7 mbar; (iv) ≥ 1.0 mbar; (v) ≥ 1.3 mbar; (vi) ≥ 1.5 mbar; (vii) ≥ 2.0 mbar; (viii) ≥ 2.5 mbar; (ix) ≥ 3.0 mbar; (x) ≥ 3.5 mbar; (xi) ≥ 4.0 mbar; (xii) ≥ 4.5 mbar; (xiii) ≥ 5.0 mbar; (xiv) ≥ 6.0 mbar; (xv) ≥ 7.0 mbar; (xvi) ≥ 8.0 mbar; (xvii) ≥ 9.0 mbar; (xviii) ≥ 10.0 mbar; (xix) 1-5 mbar; (xx) 1-2 mbar; and (xxi) 0.5-1.5 mbar.

25. (currently amended) A mass spectrometer as claimed in claim 1, wherein the electrodes forming the AC ion guide have a thickness selected from the group consisting

of: (i) ≤ 2 mm; (ii) ≤ 1 mm; (iii) 0.5 ~~.05~~ ± 0.2 mm; (iv) 0.7 ~~.07~~ ± 0.1 mm; and (v) 0.5 - 0.7 mm.

26. (previously presented) A mass spectrometer as claimed in claim 24, wherein said input vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) ≤ 20 mbar; and (ii) ≤ 30 mbar.

27. (previously presented) A method of mass spectrometry, comprising:

producing ions from an ion source;

transmitting at least some of said ions through an input vacuum chamber comprising at least one AC ion guide for transmitting said ions, said AC ion guide comprising a plurality of electrodes having apertures, said apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

providing AC potentials to said plurality of electrodes from at least one alternating current (AC) generator connected to an input chamber reference potential;

passing said ions to an analyzer vacuum chamber comprising an ion mass analyzer disposed to receive ions after they have been transmitted by said ion guide;

wherein at least one differential pumping apertured electrode is provided though which ions may pass, said at least one differential pumping apertured electrode being disposed between said input vacuum chamber and said analyzer vacuum chamber to permit said analyzer vacuum chamber to be maintained at a lower pressure than said input vacuum chamber; and

wherein at least 90% of said apertures are substantially the same size and at least 90% of said plurality of electrodes forming said AC ion guide are connected to said AC generator in such a way that at any instant during an AC cycle of the output of said AC generator, adjacent ones of said electrodes are supplied respectively with approximately equal positive and negative potentials relative to said input chamber reference potential;

said method further comprising the step of:

maintaining said input vacuum chamber at a pressure selected from the group consisting of: (i) ≥ 0.1 mbar; (ii) ≥ 0.5 mbar; (iii) ≥ 0.7 mbar; (iv) ≥ 1.0 mbar; (v) ≥ 1.3 mbar; (vi) ≥ 1.5 mbar; (vii) ≥ 2.0 mbar; (viii) ≥ 2.5 mbar; (ix) ≥ 3.0 mbar; (x) ≥ 3.5 mbar; (xi) ≥ 4.0 mbar; (xii) ≥ 4.5 mbar; (xiii) ≥ 5.0 mbar; (xiv) ≥ 6.0 mbar; (xv) ≥ 7.0 mbar; (xvi) ≥ 8.0 mbar; (xvii) ≥ 9.0 mbar; (xviii) ≥ 10.0 mbar; (xix) 1-5 mbar; (xx) 1-2 mbar; and (xxi) 0.5-1.5 mbar.

28. (previously presented) A method as claimed in claim 27, further comprising maintaining said input vacuum chamber at a pressure selected from the group consisting of: (i) ≤ 20 mbar; and (ii) ≤ 30 mbar.

29. (previously presented) A method as claimed in claim 27, further comprising:

providing an intermediate vacuum chamber disposed between said input vacuum chamber and said analyzer vacuum chamber, said intermediate vacuum chamber comprising an AC ion guide for transmitting ions through said intermediate vacuum chamber, said AC ion guide arranged in said intermediate vacuum chamber comprising a plurality of electrodes having apertures, the apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

providing at least one further differential pumping apertured electrode through which ions may pass, disposed between said vacuum chambers to allow said intermediate vacuum chamber to be maintained at a lower pressure than said input vacuum chamber, and said analyzer vacuum chamber to be maintained at a lower pressure than said intermediate vacuum chamber; and

providing an alternating current (AC) generator connected to an intermediate chamber reference potential for providing AC potentials to the AC ion guide in said intermediate vacuum chamber.

30. (previously presented) A method as claimed in claim 29, further comprising maintaining said intermediate vacuum chamber at a pressure selected from the group consisting of: (i) 10^{-3}-10^{-2} mbar; (ii) ≥ 2 x 10^{-3} mbar; (iii) ≥ 5 x 10^{-3} mbar; (iv) ≤ 10^{-2} mbar; (v) 10^{-3}-5 x 10^{-3} mbar; and (vi) 5 x 10^{-3}-10^{-2} mbar.

31. (previously presented) A method as claimed in claim 27, further comprising maintaining the AC ion guide having a length L in the input vacuum chamber at a pressure P, wherein the pressure-length product P x L is selected from the group consisting of: (i) ≥ 1 mbar cm; (ii) ≥ 2 mbar cm; (iii) ≥ 5 mbar cm; (iv) ≥10 mbar cm; (v) ≥ 15 mbar cm; (vi) ≥ 20 mbar cm; (vii) ≥ 25 mbar cm; (viii) ≥30 mbar cm; (ix) ≥ 40 mbar cm; (x) ≥ 50 mbar cm; (xi) ≥60 mbar cm; (xii) ≥ 70 mbar cm; (xiii) ≥ 80 mbar cm; (xiv) ≥ 90 mbar cm; (xv) ≥ 100 mbar cm; (xvi) ≥ 110 mbar cm; (xvii) ≥ 120 mbar cm; (xviii) ≥ 130 mbar cm; (xix) ≥ 140 mbar cm; (xx) ≥ 150 mbar cm; (xxi) ≥ 160 mbar cm; (xxii) ≥ 170 mbar cm; (xxiii) ≥ 180 mbar cm; (xxiv) ≥ 190 mbar cm; and (xxv) ≥ 200 mbar cm.

32. (currently amended) A mass spectrometer as claimed in claim 1 wherein, if the AC ion guide has a length L and is maintained in the input vacuum at a pressure P, then the pressure-length product P x L is selected from the group consisting of: (i) ≥ ~~12 mbar cm~~ 1 mbar cm; (ii) ≥ 2 mbar cm; (iii) ≥ 5 mbar cm; (iv) ≥ 10 mbar cm; (v) ≥ 15 mbar cm; (vi) ≥ 20 mbar cm; (vii) 25 mbar cm; (viii) ≥ 30 mbar cm; (ix) ≥ 40 mbar cm; (x) ≥ 50 mbar cm; (xi) ≥ 60 mbar cm; (xii) ≥ 70 mbar cm; (xiii) ≥ 80 mbar cm; (xiv) ≥ 90 mbar cm; (xv) ≥ 100 mbar cm; (xvi) ≥ 110 mbar cm; (xvii) ≥ 120 mbar cm; (xviii) ≥ 130 mbar cm; (xix) ≥ 140 mbar cm; (xx) ≥ 150 mbar cm; (xxi) ≥ 160 mbar cm; (xxii) ≥ 170 mbar cm; (xxiii) ≥ 180 mbar cm; (xxiv) ≥ 190 mbar cm; and (xxv) ≥ 200 mbar cm.

33. (previously presented) A mass spectrometer comprising:

an ion source for producing ions;

an input vacuum chamber comprising at least one AC ion guide for transmitting said ions, wherein the AC ion guide comprises two interleaved comb arrangements, each said comb arrangement comprising a plurality of electrodes having apertures;

an analyzer vacuum chamber comprising a mass analyzer disposed to receive ions after they have been transmitted by said ion guide; and

at least one differential pumping apertured electrode through which ions may pass, said at least one differential pumping apertured electrode being disposed between said input vacuum chamber and said analyzer vacuum chamber to permit said analyzer vacuum chamber to be maintained at a lower pressure than said input vacuum chamber.

34. (previously presented) A mass spectrometer as claimed in claim 33, wherein at least 90% of said apertures are substantially the same size.

35. (previously presented) A mass spectrometer as claimed in claim 33, wherein said plurality of electrodes forming said AC ion guide are connected to an AC generator in such a way that at any instant during an AC cycle of the output of said AC generator, adjacent ones of said electrodes are supplied respectively with approximately equal positive and negative potentials relative to an input chamber reference potential.

36. (previously presented) A mass spectrometer as claimed in claim 33, wherein each comb arrangement comprises a longitudinally extending member having a plurality of electrodes having apertures depending therefrom.

37. (previously presented) A mass spectrometer as claimed in claim 33, wherein said input vacuum chamber has a length and said comb arrangements extend at least x% of said length, x% selected from the group consisting of: (i) ≥ 50%; (ii) ≥ 60%; (iii) ≥ 70%; (iv) ≥ 80%; (v) ≥ 90%; and (vi) ≥ 95%.

38. (previously presented) A mass spectrometer as claimed in claim 33, wherein alternate ones of said electrodes are connected to each other and to one of the output connections of a single AC generator.

39. (previously presented) A mass spectrometer as claimed in claim 33, wherein the AC ion guide comprises at least 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100 electrodes.

40. (previously presented) A mass spectrometer as claimed in claim 33, wherein said electrodes have internal diameters or dimensions selected from the group consisting of: (i) ≤ 5.0 mm; (ii) ≤ 4.5 mm; (iii) ≤ 4.0 mm; (iv) ≤ 3.5 mm; (v) ≤ 3.0 mm; (vi) ≤ 2.5 mm; (vii) 3.0 ± 0.5 mm; (viii) ≤ 10.0 mm; (ix) ≤ 9.0 mm; (x) ≤ 8.0 mm; (xi) ≤ 7.0 mm; (xii) ≤ 6.0 mm; (xiii) 5.0 ± 0.5 mm; and (xiv) 4-6 mm.

41. (previously presented) A mass spectrometer as claimed in claim 33, wherein the length of said AC ion guide is selected from the group consisting of: (i) ≥ 100 mm; (ii) ≥ 120 mm; (iii) ≥ 150 mm; (iv) 130 ± 10 mm; (v) 100-150 mm; (vi) ≤ 160 mm; (vii) ≤ 180 mm; (viii) ≤ 200 mm; (ix) 130-150 mm; (x) 120-180 mm; (xi) 120-140 mm; (xii) 130 mm ± 5, 10, 15, 20, 25 or 30 mm; (xiii) 50-300 mm; (xiv) 150-300 mm; (xv) ≥ 50 mm; (xvi) 50-100 mm; (xvii) 60-90 mm; (xviii) ≥ 75 mm; (xix) 50-75 mm; (xx) 75-100 mm; (xxi) 150-200 mm; (xxii) ≥ 200 mm; and (xxiii) 50-200 mm.

42. (previously presented) A mass spectrometer as claimed in claim 33, further comprising:

an intermediate vacuum chamber disposed between said input vacuum chamber and said analyzer vacuum chamber, said intermediate vacuum chamber comprising an AC ion guide for transmitting ions through said intermediate vacuum chamber, said AC ion guide arranged in said intermediate vacuum chamber comprising a plurality of electrodes having apertures, the apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

at least one further differential pumping apertured electrode through which ions may pass, disposed between said vacuum chambers to allow said intermediate vacuum chamber to be maintained at a lower pressure than said input vacuum chamber, and said analyzer vacuum chamber to be maintained at a lower pressure than said intermediate vacuum chamber; and

an alternating current (AC) generator connected to an intermediate chamber reference potential for providing AC potentials to the AC ion guide in said intermediate vacuum chamber.

43. (previously presented) A mass spectrometer as claimed in claim 42, wherein at least 90% of the apertures of the electrodes forming said AC ion guide in said intermediate vacuum chamber are substantially the same size; and

at least 90% of said plurality of the electrodes forming said AC ion guide in said intermediate vacuum chamber are connected to the AC generator connected to said intermediate chamber reference potential in such a way that at any instant during an AC cycle of the output of the AC generator, adjacent ones of said electrodes forming said AC ion guide arranged in said intermediate vacuum chamber are supplied respectively with approximately equal positive and negative potentials relative to said intermediate chamber reference potential.

44. (previously presented) A mass spectrometer as claimed in claim 42, wherein the AC ion guide in said intermediate vacuum chamber comprises at least 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, or 100 electrodes.

45. (previously presented) A mass spectrometer as claimed in claim 42, wherein said intermediate vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) 10^{-3}-10^{-2} mbar; (ii) $\geq 2 \times 10^{-3}$ mbar; (iii) $\geq 5 \times 10^{-3}$ mbar; (iv) $\leq 10^{-2}$ mbar; (v) 10^{-3}-5×10^{-3} mbar; and (vi) 5×10^{-3}-10^{-2} mbar.

46. (previously presented) A mass spectrometer as claimed in claim 42, wherein electrodes forming said AC ion guide in said intermediate vacuum chamber have internal diameters or dimensions selected from the group consisting of: (i) ≤ 5.0 mm; (ii) ≤ 4.5 mm; (iii) ≤ 4.0 mm; (iv) ≤ 3.5 mm; (v) ≤ 3.0 mm; (vi) ≤ 2.5 mm; (vii) 3.0 ± 0.5 mm; (viii) ≤ 10.0 mm; (ix) ≤ 9.0 mm; (x) ≤ 8.0 mm; (xi) ≤ 7.0 mm; (xii) ≤ 6.0 mm; (xiii) 5.0 ± 0.5 mm; and (xiv) 4-6 mm.

47. (previously presented) A mass spectrometer as claimed in claim 42, wherein the length of said ion guide in said intermediate vacuum chamber is selected from the group consisting of: (i) ≥ 100 mm; (ii) ≥ 120 mm; (iii) ≥ 150 mm; (iv) 130 ± 10 mm; (v) 100-150 mm; (vi) ≤ 160 mm; (vii) ≤ 180 mm; (viii) ≤ 200 mm; (ix) 130-150 mm; (x) 120-180 mm; (xi) 120-140 mm; (xii) 130 mm ± 5, 10, 15, 20, 25 or 30 mm; (xiii) 50-300 mm; (xiv) 150-300 mm; (xv) ≥ 50 mm; (xvi) 50-100 mm; (xvii) 60-90 mm; (xviii) ≥ 75 mm; (xix) 50-75 mm; (xx) 75-100 mm; (xxi) 150-200 mm; (xxii) ≥ 200 mm; and (xxiii) 50-200 mm.

48. (previously presented) A mass spectrometer as claimed in claim 33, wherein said ion source is an atmospheric pressure ion source.

49. (previously presented) A mass spectrometer as claimed in claim 33, wherein said ion source is a continuous ion source.

50. (previously presented) A mass spectrometer as claimed in claim 48, wherein said ion source is an Electrospray ("ES") ion source or an Atmospheric Pressure Chemical Ionisation ("APCI") ion source.

51. (previously presented) A mass spectrometer as claimed in claim 48, wherein said ion source is an Inductively Coupled Plasma ("ICP") ion source.

52. (previously presented) A mass spectrometer as claimed in claim 49, wherein said ion source is an Electrospray ("ES") ion source or an Atmospheric Pressure Chemical Ionisation ("APCI") ion source.

53. (previously presented) A mass spectrometer as claimed in claim 49, wherein said ion source is an Inductively Coupled Plasma ("ICP") ion source.

54. (previously presented) A mass spectrometer as claimed in claim 33, wherein said ion source is a Matrix Assisted Laser Desorption Ionisation ("MALDI") ion source.

55. (previously presented) A mass spectrometer as claimed in claim 33, wherein said ion mass analyser is selected from the group consisting of: (i) a Time of Flight mass analyser,

(ii) an orthogonal Time of Flight mass analyser; (iii) a quadrupole mass analyser; and (iv) a quadrupole ion trap.

56. (previously presented) A mass spectrometer as claimed in claim 33, wherein said input vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) ≥ 0.1 mbar; (ii) ≥ 0.5 mbar; (iii) ≥ 0.7 mbar; (iv) ≥ 1.0 mbar; (v) ≥ 1.3 mbar; (vi) ≥ 1.5 mbar; (vii) ≥ 2.0 mbar; (viii) ≥ 2.5 mbar; (ix) ≥ 3.0 mbar; (x) ≥ 3.5 mbar; (xi) ≥ 4.0 mbar; (xii) ≥ 4.5 mbar; (xiii) ≥ 5.0 mbar; (xiv) ≥ 6.0 mbar; (xv) ≥ 7.0 mbar; (xvi) ≥ 8.0 mbar; (xvii) ≥ 9.0 mbar; (xviii) ≥ 10.0 mbar; (xix) 1-5 mbar; (xx) 1-2 mbar; and (xxi) 0.5-1.5 mbar.

57. (previously presented) A mass spectrometer as claimed in claim 33, wherein said input vacuum chamber is arranged to be maintained at a pressure selected from the group consisting of: (i) ≤ 20 mbar; and (ii) ≤ 30 mbar.

58. (previously presented) A mass spectrometer as claimed in claim 33, wherein if the AC ion guide has a length L and is maintained in the input vacuum chamber at a pressure P, then the pressure-length product p x L is selected from the group consisting of: (i) ≥ 1 mbar cm; (ii) ≥ 2 mbar cm; (iii) ≥ 5 mbar cm; (iv) ≥ 10 mbar cm; (v) ≥ 15 mbar cm; (vi) ≥ 20 mbar cm; (vii) ≥ 25 mbar cm; (viii) ≥ 30 mbar cm; (ix) ≥ 40 mbar cm; (x) ≥ 50 mbar cm; (xi) ≥ 60 mbar cm; (xii) ≥ 70 mbar cm; (xiii) ≥ 80 mbar cm; (xiv) ≥ 90 mbar cm; (xv) ≥ 100 mbar cm; (xvi) ≥ 110 mbar cm; (xvii) ≥ 120 mbar cm; (xviii) ≥ 130 mbar cm; (xix) ≥ 140 mbar cm; (xx) ≥ 150 mbar cm; (xxi) ≥ 160 mbar cm; (xxii) ≥ 170 mbar cm; (xxiii) ≥ 180 mbar cm; (xxiv) ≥ 190 mbar cm; and (xxv) ≥ 200 mbar cm.

59. (previously presented) A mass spectrometer as claimed in claim 33, wherein the electrodes forming the AC ion guide have a thickness selected from the group consisting of: (i) ≤ 2 mm; (ii) ≤ 1 mm; (iii) 0.5 ± 0.2 mm; (iv) 0.7 ± 0.1 mm; and (v) 0.5-0.7 mm.

60. (previously presented) A method of mass spectrometry comprising:

producing ions from an ion source;

transmitting at least some of said ions through an input vacuum chamber comprising at least one AC ion guide for transmitting said ions, said AC ion guide comprising two interleaved comb arrangements, each said comb arrangement comprising a plurality of electrodes having apertures;

passing said ions to an analyzer vacuum chamber comprising a mass analyzer disposed to receive ions after they have been transmitted by said ion guide;

wherein at least one differential pumping apertured electrode is provided though which ions may pass, said at least one differential pumping apertured electrode being disposed between said input vacuum chamber and said analyzer vacuum chamber to permit said analyzer vacuum chamber to be maintained at a lower pressure than said input vacuum chamber.

61. (previously presented) A method as claimed in claim 60, wherein each comb arrangement comprises a longitudinally extending member having a plurality of electrodes having apertures depending therefrom.

62. (previously presented) A method as claimed in claim 60, further comprising maintaining said input vacuum chamber at a pressure selected from the group consisting of: (i) $\geq$ 0.1 mbar; (ii) $\geq$ 0.5 mbar; (iii) $\geq$ 0.7 mbar; (iv) $\geq$ 1.0 mbar; (v) $\geq$ 1.3 mbar; (vi) $\geq$ 1.5 mbar; (vii) $\geq$ 2.0 mbar; (viii) $\geq$ 2.5 mbar; (ix) $\geq$ 3.0 mbar; (x) $\geq$ 3.5 mbar; (xi) $\geq$ 4.0 mbar; (xii) $\geq$ 4.5 mbar; (xiii) $\geq$ 5.0 mbar; (xiv) $\geq$ 6.0 mbar; (xv) $\geq$ 7.0 mbar; (xvi) $\geq$ 8.0 mbar; (xvii) $\geq$ 9.0 mbar; (xviii) $\geq$ 10.0 mbar; (xix) 1-5 mbar; (xx) 1-2 mbar; and (xxi) 0.5-1.5 mbar.

63. (previously presented) A method as claimed in claim 60, further comprising maintaining said input vacuum chamber at a pressure selected from the group consisting of: (i) $\leq$ 20 mbar; and (ii) $\leq$ 30 mbar.

64. (previously presented) A method as claimed in claim 60, further comprising:

providing an intermediate vacuum chamber disposed between said input vacuum chamber and said analyzer vacuum chamber, said intermediate vacuum chamber comprising an AC ion guide for transmitting ions through said intermediate vacuum chamber, said AC ion guide arranged in said intermediate vacuum chamber comprising a plurality of electrodes having apertures, the apertures being aligned so that ions travel through them as they are transmitted by said ion guide;

providing at least one further differential pumping apertured electrode through which ions may pass, disposed between said vacuum chambers to allow said intermediate vacuum chamber to be maintained at a lower pressure than said input vacuum chamber,

and said analyzer vacuum chamber to be maintained at a lower pressure than said intermediate vacuum chamber; and

providing an alternating current (AC) generator connected to an intermediate chamber reference potential for providing AC potentials to the AC ion guide in said intermediate vacuum chamber.

65. (previously presented) A method as claimed in claim 64, further comprising maintaining said intermediate vacuum chamber at a pressure selected from the group consisting of: (i) 10^{-3}-10^{-2} mbar; (ii) $\geq 2 \times 10^{-3}$ mbar; (iii) $\geq 5 \times 10^{-3}$ mbar; (iv) $\leq 10^{-2}$ mbar; (v) 10^{-3}-5×10^{-3} mbar; and (vi) 5×10^{-3}-10^{-2} mbar.

66. (previously presented) A method as claimed in claim 60, further comprising maintaining the AC ion guide having a length L in the input vacuum chamber at a pressure P, wherein the pressure-length product p x L is selected from the group consisting of: (i) ≥ 1 mbar cm; (ii) ≥ 2 mbar cm; (iii) ≥ 5 mbar cm; (iv) ≥ 10 mbar cm; (v) ≥ 15 mbar cm; (vi) ≥ 20 mbar cm; (vii) ≥ 25 mbar cm; (viii) ≥ 30 mbar cm; (ix) ≥ 40 mbar cm; (x) ≥ 50 mbar cm; (xi) ≥ 60 mbar cm; (xii) ≥ 70 mbar cm; (xiii) ≥ 80 mbar cm; (xiv) ≥ 90 mbar cm; (xv) ≥ 100 mbar cm; (xvi) ≥ 110 mbar cm; (xvii) ≥ 120 mbar cm; (xviii) ≥ 130 mbar cm; (xix) ≥ 140 mbar cm; (xx) ≥ 150 mbar cm; (xxi) ≥ 160 mbar cm; (xxii) ≥ 170 mbar cm; (xxiii) ≥ 180 mbar cm; (xxiv) ≥ 190 mbar cm; and (xxv) ≥ 200 mbar cm.

67-69. (canceled)